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EXAMINER	
CLARK, MAXWELL A	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/542,220	NAGATA, KENGO	
	Examiner	Art Unit	
	MAXWELL A. CLARK	2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 July 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 July 2005* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *07/14/2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Drawings

The drawings are objected to; refer to fig. 22, elements 23 and 26, "Flame" should be changed to "Frame". Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-27 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claims 1-5 and 18, the phrase ""STAs "capable" of using plural radio channels"" renders the claim indefinite because it is unclear whether the limitation(s) following the phrase are part of the claimed invention. It is unclear whether the claims are intended to include only STAs "capable" of using plural radio channels or include the limitation of STAs using plural radio channels because the claims dependent on the independent claim appear to claim the latter.

The term "lowest" in claim 6 is a relative term which renders the claim indefinite. The term "lowest" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Regarding claim 6, the phrase ""STAs "capable" of using MIMO"" renders the claim indefinite because it is unclear whether the limitation(s) following the phrase are part of the claimed invention. It is unclear whether the claims are intended to include only STAs "capable" of using MIMO or include the limitation of STAs using M because the claims dependent on the independent claim appear to claim the latter.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claim 1, is rejected under 35 U.S.C. 103(a) as being unpatentable over Kasami et al (US 2002/0181492 A1).

Regarding claim 1, Kasami discloses a wireless packet communication method transmitting a data packet between two STAs capable of using plural radio channels, by using a radio channel that is judged idle by carrier sensing, when it is detected by said carrier sensing that plural radio channels are idle at the same time, transmitting plural data packets simultaneously between said two STAs using plural idle radio channels (¶0019-¶0022, wherein a wireless communication apparatus for executing collision access control in accordance with Carrier Sense Multiple Access Collision Avoidance protocol, to transmit and receive data packets using first and second radio channels between the wireless communication apparatus and the first and second station units wherein a first wireless communication module section configured to transmit and receive the data packet in the first radio channel in first transmission and reception modes and a second communication wireless module section configured to transmit and receive the data packet in the second radio channel in the second transmission and

reception modes, respectively corresponds to a wireless packet communication method transmitting a data packet between two STAs capable of using plural radio channels, by using a radio channel that is judged idle by carrier sensing, when it is detected by said carrier sensing that plural radio channels are idle at the same time, transmitting plural data packets simultaneously between said two STAs using plural idle radio channels). Kasami does not expressly disclose transmitting on a channel that is determined idle. However, it was well known in the art at the time of the application that data transmissions occur after on a channel after it is determined that a channel is available, i.e. not in use / idle.

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kasami et al (US 2002/0181492 A1).

Regarding claim 2, Kasami discloses a wireless packet communication method transmitting a data packet between two STAs capable of using plural radio channels, by using a radio channel that is judged idle by carrier sensing, when it is detected by said carrier sensing that plural radio channels are idle at the same time, generating plural data packets having a same packet time length (¶0187, wherein setting the transmission start times of two wireless modules to be the same as each other wherein the two wireless modules are identical to each other in time length of a packet to be transmitted correspond to generating plural data packets having a same packet time length) and transmitting plural data packets having the same packet time length simultaneously between said two STAs using plural idle radio channels (¶0187-¶0188, wherein the wireless module 102-1 and wireless module 102-2 are identical to each

other in time length of a packet to be transmitted, whereby the same transmission end times are transmitted and while the wireless module 102-1 is in a transmission period, the wireless module 102-2 makes it possible to transmit an ACK packet free data packet, or alternatively, a broadcast packet or multicast packet corresponding to transmitting plural data packets having the same packet time length simultaneously between said two STAs using plural idle radio channels). Kasami does not expressly disclose transmitting on a channel that is determined idle. However, it was well known in the art at the time of the application that data transmissions occur after on a channel after it is determined that a channel is available, i.e. not in use / idle.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kasami et al (US 2002/0181492 A1).

Regarding claim 3, Kasami discloses a wireless packet communication method transmitting a data packet between two STAs capable of using plural radio channels and setting transmission rates for respective radio channels, by using a radio channel that is judged idle by carrier sensing, when it is detected by said carrier sensing that plural radio channels are idle at the same time, generating plural data packets having a same packet time length in accordance with transmission rates of plural idle radio channels (¶0187, wherein setting the transmission start times of two wireless modules to be the same as each other wherein the two wireless modules are identical to each other in time length of a packet to be transmitted whereby the same transmission end times are transmitted correspond to generating plural data packets having a same packet time length in accordance with transmission rates of plural idle radio channels)

and transmitting plural data packets having the same packet time length simultaneously between said two STAs using plural idle radio channels (¶0187-¶0188, wherein the wireless module 102-1 and wireless module 102-2 are identical to each other in time length of a packet to be transmitted, whereby the same transmission end times are transmitted and while the wireless module 102-1 is in a transmission period, the wireless module 102-2 makes it possible to transmit an ACK packet free data packet, or alternatively, a broadcast packet or multicast packet corresponding to transmitting plural data packets having the same packet time length simultaneously between said two STAs using plural idle radio channels). Kasami does not expressly disclose transmitting on a channel that is determined idle. However, it was well known in the art at the time of the application that data transmissions occur after on a channel after it is determined that a channel is available, i.e. not in use / idle.

Claims 4, 5, 7, 17, 26 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kasami et al (US 20020181492 A1) in view of Baker et al. (US 6,519,259 B1).

Regarding claim 4, Kasami discloses a wireless packet communication method transmitting a data packet between two STAs capable of using plural radio channels and setting transmission rates for respective radio channels, by using a radio channel that is judged idle by carrier sensing, when it is detected by said carrier sensing that plural radio channels are idle at the same time, generating plural data packets having a same packet time length (¶0187, wherein setting the transmission start times of two wireless modules to be the same as each other wherein the two wireless modules are

identical to each other in time length of a packet to be transmitted correspond to generating plural data packets having a same packet time length) and transmitting plural data packets having the same packet time length simultaneously between said two STAs using plural idle radio channels (¶0187-¶0188, wherein the wireless module 102-1 and wireless module 102-2 are identical to each other in time length of a packet to be transmitted, whereby the same transmission end times are transmitted and while the wireless module 102-1 is in a transmission period, the wireless module 102-2 makes it possible to transmit an ACK packet free data packet, or alternatively, a broadcast packet or multicast packet corresponding to transmitting plural data packets having the same packet time length simultaneously between said two STAs using plural idle radio channels). Kasami does not expressly disclose transmitting on a channel that is determined idle. However, it was well known in the art at the time of the application that data transmissions occur after on a channel after it is determined that a channel is available, i.e. not in use / idle. Kasami does not expressly disclose setting transmission rates of plural idle radio channels to a same transmission rate. Baker discloses all packets are transmitted at the same rate, col. 4, lines 50-51, which allows the far-end receiver to more readily detect lost or misinserted packets, and to apply corrective treatments in a timely and consistent manner. It would have been obvious to one of ordinary skill in the art to disclose setting transmission rates of plural idle radio channels to a same transmission rate to allow the far-end receiver to more readily detect lost or misinserted packets, and to apply corrective treatments in a timely and consistent manner.

Regarding claim 5, Baker discloses setting said transmission rates of said plural idle radio channels equal to a lowest one of said transmission rates (col. 12, lines 9-11, wherein the rate assignment algorithm is the Lowest Rate (OTC-LR) which corresponds to transmission rates of said plural idle radio channels equal to a lowest one of said transmission rates).

Claims 6, 8, 9 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kasami et al (US 2002/0181492 A1)

Regarding claim 6, Kasami discloses a wireless packet communication method transmitting a data packet between two STAs, by using a radio channel that is judged idle by carrier sensing, when it is detected by said carrier sensing that at least one radio channel is idle, generating plural data packets having a same packet time length (¶0187, wherein setting the transmission start times of two wireless modules to be the same as each other wherein the two wireless modules are identical to each other in time length of a packet to be transmitted correspond to generating plural data packets having a same packet time length) and transmitting plural data packets having the same packet time length simultaneously between said two STAs (¶0187-¶0188, wherein the wireless module 102-1 and wireless module 102-2 are identical to each other in time length of a packet to be transmitted, whereby the same transmission end times are transmitted and while the wireless module 102-1 is in a transmission period, the wireless module 102-2 makes it possible to transmit an ACK packet free data packet, or alternatively, a broadcast packet or multicast packet corresponding to transmitting plural data packets having the same packet time length simultaneously between said two

STAs). Kasami does not expressly disclose transmitting on a channel that is determined idle. However, it was well known in the art at the time of the application that data transmissions occur after on a channel after it is determined that a channel is available, i.e. not in use / idle. Kasami discloses an adaptive array antenna illustrated in fig. 4. Kasami does not expressly disclose using MIMO. It would have been obvious to one of ordinary skill in the art at the time of the application to include MIMO in Kasami for the purpose of effectively improving the link throughput.

Regarding claim 7, Kasami discloses transmitting plural data packets having a same packet time length simultaneously between said two STAs using plural idle radio channels and said MIMO, the plural data packets being in a number that is equal to a sum of MIMO numbers of plural respective radio channels, and said STAs capable of using plural radio channels and MIMO together (¶0187, wherein setting the transmission start times of two wireless modules to be the same as each other wherein the two wireless modules are identical to each other in time length of a packet to be transmitted correspond to transmitting plural data packets having a same packet time length simultaneously between said two STAs using plural idle radio channels and ¶0187-¶0188, wherein the wireless module 102-1 and wireless module 102-2 are identical to each other in time length of a packet to be transmitted, whereby the same transmission end times are transmitted and while the wireless module 102-1 is in a transmission period, the wireless module 102-2 makes it possible to transmit an ACK packet free data packet, or alternatively, a broadcast packet or multicast packet corresponding to transmitting plural data packets having a same packet time length

simultaneously between said two STAs using plural idle radio channels and said MIMO, the plural data packets being in a number that is equal to a sum of MIMO numbers of plural respective radio channels, and said STAs capable of using plural radio channels and MIMO together).

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kasami et al (US 2002/0181492 A1) in view of Chang et al. (US 2004/0114506 A1).

Regarding claim 8, Kasami discloses transmitting plural data packets having a same packet time length simultaneously between said two STAs using plural idle radio channels and said MIMO, the plural data packets being in a number that is equal to a sum of MIMO numbers of plural respective radio channels, and said STAs capable of using plural radio channels and MIMO together (¶0187, wherein setting the transmission start times of two wireless modules to be the same as each other wherein the two wireless modules are identical to each other in time length of a packet to be transmitted correspond to transmitting plural data packets having a same packet time length simultaneously between said two STAs using plural idle radio channels and ¶0187-¶0188, wherein the wireless module 102-1 and wireless module 102-2 are identical to each other in time length of a packet to be transmitted, whereby the same transmission end times are transmitted and while the wireless module 102-1 is in a transmission period, the wireless module 102-2 makes it possible to transmit an ACK packet free data packet, or alternatively, a broadcast packet or multicast packet corresponding to transmitting plural data packets having a same packet time length simultaneously between said two STAs using plural idle radio channels and said MIMO,

the plural data packets being in a number that is equal to a sum of MIMO numbers of plural respective radio channels, and said STAs capable of using plural radio channels and MIMO together). Kasami does not expressly disclose selecting a radio channel or channels that is not influenced from leakage power from said radio channel being used for said transmission. Chang discloses calculating a power leakage value affecting the adjacent sub-channels in a frequency domain using coefficients of the approximated polynomial function, and determining a weight value to be assigned to each transmit data based on the power leakage value, ¶0011, for the purpose of assigning channels where the leakage power interfering with the intended data transmission. It would have been obvious to one of ordinary skill in the art at the time of the application to include calculating a power leakage value affecting the adjacent sub-channels in a frequency domain using coefficients of the approximated polynomial function, and determining a weight value to be assigned to each transmit data based on the power leakage value for the purpose of assigning channels where the leakage power interfering with the intended data transmission.

Regarding claim 9, Kasami discloses deferring any transmission process including carrier sensing until completion of said transmission (¶0126, wherein when a transmission request occurs the station sets at the transmitting/receiving section the data to be transmitted by the control section and when the transmitting of the data packet is prepared, a RTS (request to set) packet is transmitted to the access point from the transmitting/receiving section of the station and the access point waits for a time duration td1 from the reception of the RTS packet to transmit CTS (clear to sent) packet

to the station, after the station receives CTS packet, then transmissions occur which corresponds to deferring any transmission process including carrier sensing until completion of said transmission).

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kasami et al (US 2002/0181492 A1) in view of Yi et al. (US 2003/0128705 A1).

Regarding claim 13, Kasami discloses a wireless packet communication method transmitting a data packet between two STAs, by using a radio channel that is judged idle by carrier sensing, when it is detected by said carrier sensing that at least one radio channel is idle, generating plural data packets having a same packet time length (¶0187, wherein setting the transmission start times of two wireless modules to be the same as each other wherein the two wireless modules are identical to each other in time length of a packet to be transmitted correspond to generating plural data packets having a same packet time length) and transmitting plural data packets having the same packet time length simultaneously between said two STAs (¶0187-¶0188, wherein the wireless module 102-1 and wireless module 102-2 are identical to each other in time length of a packet to be transmitted, whereby the same transmission end times are transmitted and while the wireless module 102-1 is in a transmission period, the wireless module 102-2 makes it possible to transmit an ACK packet free data packet, or alternatively, a broadcast packet or multicast packet corresponding to transmitting plural data packets having the same packet time length simultaneously between said two STAs). Kasami does not expressly disclose simultaneously transmitting data packets generated from all transmission-standby data frames when a number of transmission-

standby data frames are smaller than or equal to a MIMO number; and said STA generates and simultaneously transmits a same number of data packets as said MIMO number when the number of transmission-standby data frames exceeds said MIMO number. Yi discloses the UTRAN not to transmit (or re-transmit) a data block that was not received within the time period of 2*T1 because the maximum reception standby time the receiver can wait for a data block is 2*T1 without violating the wrap-around condition so that data blocks re-transmitted after this time are preferably discarded in the user equipment even if correctly received and therefore, a discard timer is preferably provided for each HARQ process in the UTRAN, and the period of the discard timer is preferably set to no more than twice the stall timer period in the user equipment receiver, ¶0183 for the purpose of managing data blocks in reordering in a way that avoids a stall condition. It would have been obvious to one of ordinary skill in the art at the time of the application to include transmitting data packets generated from all transmission-standby data frames when a number of transmission-standby data frames is smaller than or equal to a MIMO number; and said STA generates and simultaneously transmits a same number of data packets as said MIMO number when the number of transmission-standby data frames exceeds said MIMO number as in Yi for the purpose of managing data blocks in reordering in a way that avoids a stall condition.

Regarding claim 17, Kasami discloses transmitting plural data packets having a same packet time length simultaneously between said two STAs using plural idle radio channels and said MIMO, the plural data packets being in a number that is equal to a

sum of MIMO numbers of plural respective radio channels, and said STAs capable of using plural radio channels and MIMO together (¶0187, wherein setting the transmission start times of two wireless modules to be the same as each other wherein the two wireless modules are identical to each other in time length of a packet to be transmitted correspond to transmitting plural data packets having a same packet time length simultaneously between said two STAs using plural idle radio channels and ¶0187-¶0188, wherein the wireless module 102-1 and wireless module 102-2 are identical to each other in time length of a packet to be transmitted, whereby the same transmission end times are transmitted and while the wireless module 102-1 is in a transmission period, the wireless module 102-2 makes it possible to transmit an ACK packet free data packet, or alternatively, a broadcast packet or multicast packet corresponding to transmitting plural data packets having a same packet time length simultaneously between said two STAs using plural idle radio channels and said MIMO, the plural data packets being in a number that is equal to a sum of MIMO numbers of plural respective radio channels, and said STAs capable of using plural radio channels and MIMO together). Kasami does not expressly disclose the STA selecting one of a first mode in which a single radio channel is used and MIMO is not used, a second mode in which a single radio channel and MIMO are used, a third mode in which plural radio channels are used and MIMO is not used, and a fourth mode in which plural radio channels and MIMO are used, the selecting by the STA done according to at least one of the number of idle channels, a MIMO number of each radio channel, and a number of transmission-standby data frames. Medvedev discloses a data frame management

block includes means that selects one of a first mode in which a single radio channel is used and MIMO is not used, a second mode in which a single radio channel and MIMO are used, a third mode in which plural radio channels are used and MIMO is not used, and a fourth mode in which plural radio channels and MIMO are used, the selecting by the means done according to at least one of the number of idle channels, a MIMO number of each radio channel, and the number of transmission-standby data frames (¶0150, wherein the data rate, coding, interleaving, and modulation for each transmission channel or each group of transmission channels are determined by various controls provided by a controller 730, ¶0155, wherein the controller collects channel state information, which may comprise all or some of the information received from RX MIMO processor and RX data processor wherein the CSI is then processed by a TX data processor then modulated by a modulator, conditioned by the transmitters, and transmitted back to transmitter system and ¶0157 wherein the controllers direct the operation at the transmitter and receiver systems ant the memories provide storage for program codes and data used by controllers 730 and 770 which corresponds to the STA selecting one of a first mode in which a single radio channel is used and MIMO is not used, a second mode in which a single radio channel and MIMO are used, a third mode in which plural radio channels are used and MIMO is not used, and a fourth mode in which plural radio channels and MIMO are used, the selecting by the STA done according to at least one of the number of idle channels, a MIMO number of each radio channel, and a number of transmission-standby data frames) for the purpose of determining by various controls options provided by the controller. It would have been

obvious to one of ordinary skill in the art at the time of the application to include a data frame management block includes means that selects one of a first mode in which a single radio channel is used and MIMO is not used, a second mode in which a single radio channel and MIMO are used, a third mode in which plural radio channels are used and MIMO is not used, and a fourth mode in which plural radio channels and MIMO are used, the selecting by the means done according to at least one of the number of idle channels, a MIMO number of each radio channel, and the number of transmission-standby data frames as in Medvedev for the purpose of determining by various controls options provided by the controller.

Claims 18-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Medvedev et al (US 2003/0139196 A1).

Regarding claim 18, Medvedev discloses a wireless packet communication apparatus for transmitting a data packet between two STAs capable of using plural radio channels (fig. 7 illustrates a wireless packet communication apparatus for transmitting a data packet between two STAs capable of using plural radio channels), Medvedev does not expressly disclose using a radio channel that is judged idle by carrier sensing. Medvedev discloses transmission channels for the purpose of multi-channel communications, ¶0024. It would have been obvious to one of ordinary skill in the art at the time of the application to transmit communications channel that is first judged idle so to avoid attempting transmitting on a channel that is occupied. Medvedev discloses a transmission buffer block (fig. 7, element 712, 714, 720, 722, 754, 776, 778, 780, wherein each of the elements sited in fig. 7 temporarily holds data frames to be

transmitted as illustrated). Medvedev does not expressly disclose stored data packets that correlates address information of data frames it holds with packet sizes, and reads out and outputs a requested data packet when receiving a packet sending request. Medvedev discloses transmission channels for the purpose of multi-channel communications, ¶0024. It would have been obvious to one of ordinary skill in the art at the time of the application to store data packets that correlates address information of data frames it holds with packet sizes, and reads out and outputs a requested data packet when receiving a packet sending request in Medvedev for the purpose of directing the packets sent are directed to a desired location and time. Medvedev does not expressly disclose a channels' occupation status analyzing block that acquires pieces of idle state judgment information of a predetermined plural number of respective radio channels. Medvedev discloses transmission channels for the purpose of multi-channel communications, ¶0024. It would have been obvious to one of ordinary skill in the art at the time of the application to disclose a channels' occupation status analyzing block that acquires pieces of idle state judgment information of a predetermined plural number of respective radio channels so that transmissions occur on channels that are available to the transceiver, i.e. channels not in use or idle channels. Medvedev discloses a data packet generating block that extracts a data region or regions from one or plural received data frames, generates plural data blocks having a same packet time length, and generates data packets by adding necessary header information to said data blocks (¶0150, wherein a transmit data processor formats, codes, and interleaves the traffic data based on one or more coding schemes to provide coded data wherein

the coded traffic data may then be multiplexed with pilot data using, e.g., time division multiplex (TDM) or code division multiplex (CDM) in all or a subset of the transmission channels to be used for data transmission and the pilot data is typically a known data pattern processed in a known manner where the multiplexed pilot and coded traffic data is then modulated (i.e., symbol mapped) based, on one or more modulation schemes (e.g., BPSK, QSPK, M-PSK, or M-QAM) to provide modulation symbols and the data rate, coding, interleaving, and modulation for each transmission channel or each group of transmission channels may be determined by various controls provided by a controller) which corresponds to a data packet generating block that extracts a data region or regions from one or plural received data frames, generates plural data blocks having a same packet time length, and generates data packets by adding necessary header information to said data blocks), packet switching block that correlates said data packets generated by said data packet generating block with radio channels to be used for transmission (¶0151, wherein processing by TX MIMO processor includes decomposing an estimate of the channel response matrix, H, to obtain the unitary matrix, V, and the diagonal matrix, D, pre-multiplying the modulation symbols (i.e., the signal vector s) with the unitary matrix V, and demultiplexing the pre-conditioned symbols (i.e., the transmit vector x) into N.sub.T symbol streams. In another embodiment, the processing by TX MIMO processor which includes demultiplexing the modulation symbols into N.sub.T symbol streams (i.e., no preconditioning of the symbols with the matrix V) where the TX MIMO processor scales each symbol by an appropriate weight determined based on the amount of transmit power allocated to the

transmission channel used for that symbol and the N.sub.T (weighted) symbol streams are then provided to transmitters (TMTR) 722a through 722t) which correspond to a packet switching block that correlates said data packets generated by said data packet generating block with radio channels to be used for transmission) and data frame management block that determines one or plural data frames from which to generate data packets on the basis of pieces of information relating to respective data frames that are communicated from said transmission buffer block and information relating to radio channels that is communicated from said channels' occupation status analyzing block, and the data frame management block determines a method to generate plural data packets from one or plural data frames in accordance with the number of idle radio channels, determines radio channels on which to transmit said plural generated data packets, gives said transmission buffer block designation of a data frame or frames to be output, informs said data packet generating block of a method generating data packets from one or plural data frames that are output from said transmission buffer block, and communicates, to said packet switching block, information that is necessary for correlating said data packets with said radio channels, said wireless packet communication apparatus further characterized in that plural data packets are transmitted simultaneously between said two STAs by using plural idle radio channels (¶0150 wherein the data rate, coding, interleaving, and modulation for each transmission channel or each group of transmission channels may be determined by various controls provided by a controller and ¶0155 wherein the controller collects channel state information, which may comprise all or some of the information received

from RX MIMO processor and RX data processor wherein the CSI is then processed by a TX data processor, modulated by a modulator, conditioned by multiple transmitters, and transmitted back to transmitter system and ¶0157 wherein the controllers direct the operation at the transmitter and receiver systems wherein the memories and provide storage for program codes and data used by controllers wherein the controllers correspond to a data frame management block that determines one or plural data frames from which to generate data packets on the basis of pieces of information relating to respective data frames that are communicated from said transmission buffer block and information relating to radio channels that is communicated from said channels' occupation status analyzing block, and the data frame management block determines a method to generate plural data packets from one or plural data frames in accordance with the number of idle radio channels, determines radio channels on which to transmit said plural generated data packets, gives said transmission buffer block designation of a data frame or frames to be output, informs said data packet generating block of a method generating data packets from one or plural data frames that are output from said transmission buffer block, and communicates, to said packet switching block, information that is necessary for correlating said data packets with said radio channels, said wireless packet communication apparatus further characterized in that plural data packets are transmitted simultaneously between said two STAs by using plural idle radio channels).

Regarding claim 19, Medvedev discloses a MIMO block that transmits plural independent signals simultaneously on said respective radio channels (fig. 7, element

720, illustrates a MIMO block that transmits plural independent signals simultaneously on said respective radio channels).

Regarding claim 20, Medvedev discloses the data frame management block performs a control to generate plural data packets having a same packet time length from one or plural data frames (¶0150, wherein the data rate, coding, interleaving, and modulation for each transmission channel or each group of transmission channels are determined by various controls provided by a controller 730, ¶0155, wherein the controller collects channel state information, which may comprise all or some of the information received from RX MIMO processor and RX data processor wherein the CSI is then processed by a TX data processor then modulated by a modulator, conditioned by the transmitters, and transmitted back to transmitter system and ¶0157 wherein the controllers direct the operation at the transmitter and receiver systems ant the memories provide storage for program codes and data used by controllers 730 and 770 which corresponds to the data frame management block performing a control to generate plural data packets having a same packet time length from one or plural data frames). Medvedev does not expressly disclose transmitting on a channel that is determined idle. However, it was well known in the art at the time of the application that data transmissions occur after on a channel after it is determined that a channel is available, i.e. not in use / idle.

Regarding claim 21, Medvedev discloses data frame management block performs a control to generate plural data packets having a same packet time length from one or plural data frames, in accordance with transmission rates of plural idle radio

channels (¶0150, wherein the data rate, coding, interleaving, and modulation for each transmission channel or each group of transmission channels are determined by various controls provided by a controller 730, ¶0155, wherein the controller collects channel state information, which may comprise all or some of the information received from RX MIMO processor and RX data processor wherein the CSI is then processed by a TX data processor then modulated by a modulator, conditioned by the transmitters, and transmitted back to transmitter system and ¶0157 wherein the controllers direct the operation at the transmitter and receiver systems ant the memories provide storage for program codes and data used by controllers 730 and 770 which corresponds to data frame management block performing a control to generate plural data packets having a same packet time length from one or plural data frames, in accordance with transmission rates of plural idle radio channels). Medvedev does not expressly disclose transmitting on a channel that is determined idle. However, it was well known in the art at the time of the application that data transmissions occur after on a channel after it is determined that a channel is available, i.e. not in use / idle.

Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Medvedev et al (US 2003/0139196 A1) in view of Baker et al. (US 6,519,259 B1).

Regarding claim 22, Medvedev discloses a data frame management block performs a control to set transmission rates of plural idle radio channels to a same transmission rate and to generate plural data packets having the same packet time length from one or plural data frames (¶0150, wherein the data rate, coding, interleaving, and modulation for each transmission channel or each group of

transmission channels are determined by various controls provided by a controller 730, ¶0155, wherein the controller collects channel state information, which may comprise all or some of the information received from RX MIMO processor and RX data processor wherein the CSI is then processed by a TX data processor then modulated by a modulator, conditioned by the transmitters, and transmitted back to transmitter system and ¶0157 wherein the controllers direct the operation at the transmitter and receiver systems ant the memories provide storage for program codes and data used by controllers 730 and 770 which corresponds to a data frame management block performing a control to set transmission rates of plural idle radio channels to a same transmission rate and to generate plural data packets having the same packet time length from one or plural data frames). Medvedev does not expressly disclose transmitting on a channel that is determined idle. However, it was well known in the art at the time of the application that data transmissions occur after on a channel after it is determined that a channel is available, i.e. not in use / idle. Medvedev does not expressly disclose setting transmission rates of plural idle radio channels to a same transmission rate. Baker discloses all packets are transmitted at the same rate, col. 4, lines 50-51, which allows the far-end receiver to more readily detect lost or misinserted packets, and to apply corrective treatments in a timely and consistent manner. It would have been obvious to one of ordinary skill in the art to disclose setting transmission rates of plural idle radio channels to a same transmission rate to allow the far-end receiver to more readily detect lost or misinserted packets, and to apply corrective treatments in a timely and consistent manner.

Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Medvedev et al (US 2003/0139196 A1) in view of Chang et al. (US 2004/0114506 A1).

Regarding claim 23, Medvedev discloses a MIMO block that transmits plural independent signals simultaneously on said respective radio channels (fig. 7, element 720, illustrates a MIMO block that transmits plural independent signals simultaneously on said respective radio channels). Medvedev does not expressly disclose selecting a radio channel or channels that is not influenced by leakage power from said radio channel being used for said transmission. Chang discloses calculating a power leakage value affecting the adjacent sub-channels in a frequency domain using coefficients of the approximated polynomial function, and determining a weight value to be assigned to each transmit data based on the power leakage value, ¶0011, for the purpose of assigning channels where the leakage power interfering with the intended data transmission. It would have been obvious to one of ordinary skill in the art at the time of the application to include calculating a power leakage value affecting the adjacent sub-channels in a frequency domain using coefficients of the approximated polynomial function, and determining a weight value to be assigned to each transmit data based on the power leakage value for the purpose of assigning channels where the leakage power interfering with the intended data transmission.

Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Medvedev et al (US 2003/0139196 A1) in view of Kasami et al (US 2002/0181492 A1).

Regarding claim 24, Medvedev discloses a wireless packet communication apparatus for transmitting a data packet between two STAs capable of using plural

radio channels (fig. 7 illustrates a wireless packet communication apparatus for transmitting a data packet between two STAs capable of using plural radio channels). Medvedev does not expressly disclose prohibiting any transmission process including carrier sensing until completion of said transmission. Kasami discloses disclose prohibiting any transmission process including carrier sensing until completion of said transmission, fig. 14, wherein a transmissions process in not allowed to transmit until clear to send is provided, which is commonly used in the art to prevent transmission on a busy signal. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the application to include request and clear to send acknowledgements between stations that are transmitting between each other to prevent transmissions attempts that would interfere with ongoing transmissions.

Regarding claim 25, Medvedev discloses a data frame management block includes means that selects one of a first mode in which a single radio channel is used and MIMO is not used, a second mode in which a single radio channel and MIMO are used, a third mode in which plural radio channels are used and MIMO is not used, and a fourth mode in which plural radio channels and MIMO are used, the selecting by the means done according to at least one of the number of idle channels, a MIMO number of each radio channel, and the number of transmission-standby data frames (¶0150, wherein the data rate, coding, interleaving, and modulation for each transmission channel or each group of transmission channels are determined by various controls provided by a controller 730, ¶0155, wherein the controller collects channel state information, which may comprise all or some of the information received from RX MIMO

processor and RX data processor wherein the CSI is then processed by a TX data processor then modulated by a modulator, conditioned by the transmitters, and transmitted back to transmitter system and ¶0157 wherein the controllers direct the operation at the transmitter and receiver systems ant the memories provide storage for program codes and data used by controllers 730 and 770 which corresponds to a data frame management block including means that selects one of a first mode in which a single radio channel is used and MIMO is not used, a second mode in which a single radio channel and MIMO are used, a third mode in which plural radio channels are used and MIMO is not used, and a fourth mode in which plural radio channels and MIMO are used, the selecting by the means done according to at least one of the number of idle channels, a MIMO number of each radio channel, and the number of transmission-standby data frames).

Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kasami et al (US 2002/0181492 A1) in view of Chang et al. (US 2004/0114506 A1).

Regarding claim 26, Kasami discloses transmitting plural data packets having a same packet time length simultaneously between said two STAs using plural idle radio channels and said MIMO, the plural data packets being in a number that is equal to a sum of MIMO numbers of plural respective radio channels, and said STAs capable of using plural radio channels and MIMO together (¶0187, wherein setting the transmission start times of two wireless modules to be the same as each other wherein the two wireless modules are identical to each other in time length of a packet to be transmitted correspond to transmitting plural data packets having a same packet time

length simultaneously between said two STAs using plural idle radio channels and ¶0187-¶0188, wherein the wireless module 102-1 and wireless module 102-2 are identical to each other in time length of a packet to be transmitted, whereby the same transmission end times are transmitted and while the wireless module 102-1 is in a transmission period, the wireless module 102-2 makes it possible to transmit an ACK packet free data packet, or alternatively, a broadcast packet or multicast packet corresponding to transmitting plural data packets having a same packet time length simultaneously between said two STAs using plural idle radio channels and said MIMO, the plural data packets being in a number that is equal to a sum of MIMO numbers of plural respective radio channels, and said STAs capable of using plural radio channels and MIMO together). Kasami does not expressly disclose selecting a radio channel or channels that is not influenced from leakage power from said radio channel being used for said transmission. Chang discloses calculating a power leakage value affecting the adjacent sub-channels in a frequency domain using coefficients of the approximated polynomial function, and determining a weight value to be assigned to each transmit data based on the power leakage value, ¶0011, for the purpose of assigning channels where the leakage power interfering with the intended data transmission. It would have been obvious to one of ordinary skill in the art at the time of the application to include calculating a power leakage value affecting the adjacent sub-channels in a frequency domain using coefficients of the approximated polynomial function, and determining a weight value to be assigned to each transmit data based on the power leakage value for

the purpose of assigning channels where the leakage power interfering with the intended data transmission.

Regarding claim 27, Kasami discloses deferring any transmission process including carrier sensing until completion of said transmission (¶0126, wherein when a transmission request occurs the station sets at the transmitting/receiving section the data to be transmitted by the control section and when the transmitting of the data packet is prepared, a RTS (request to set) packet is transmitted to the access point from the transmitting/receiving section of the station and the access point waits for a time duration td1 from the reception of the RTS packet to transmit CTS (clear to sent) packet to the station, after the station receives CTS packet, then transmissions occur which corresponds to deferring any transmission process including carrier sensing until completion of said transmission).

Allowable Subject Matter

Claims 10-12 and 14-16 are objected to as being dependent upon the rejected base claim 4, but would be allowable if rewritten in independent form including all of the limitations of base claim 4 and any intervening claims.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Hu, Teck H. et al. (US 20040213184 A1), Chung; Sae-Young et al. (US 6731618 B1), Ma, Jianglei et al. (US 20040001429 A1), Garcia -Luna -Aceves, J. J. et al. (US 20020061001 A1), Garcia-Luna-Aceves, Jose Joaquin et al. (US 20020036987 A1), Garcia-Luna-Aceves; Jose Joaquin et al. (US 7002949 B2), Lyles;

Joseph Bryan et al. (US 6563829 B1), Lyles; Joseph Bryan et al. (US 5917822 A), Ehrstedt; Bjorn et al. (US 6901065 B1), Trikkonen, Olav et al. (US 20040002364 A1), Holma, Harri et al. (US 20030186698 A1), Tamaki, Tsuyoshi et al. (US 20030124976 A1),Moulsley, Timothy J. et al. (US 20020159431 A1), Raynes, Deborah L. et al. (US 20020039884 A1).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MAXWELL A. CLARK whose telephone number is (571) 270-1956. The examiner can normally be reached on Monday through Thursday 7:30A.M. to 5P.M. EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy Vu can be reached on (571) 272-3155. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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